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The Distribution of BUTTERNUT DECLINE in the EASTERN UNITED STATES

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THE DISTRIBUTION OF BUTTERNUT DECLINE IN THE EASTERN UNITED STATES

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INTRODUCTION

A canker-dieback has been recognized historically as the primary disease affecting butternut, Juglans cinerea (Hepting, 1971). This disease was attributed to the action of a fungus, Melanconium oblongum Berk (Graves, 1923). The perfect state of this fungus is Melanconis juglandis (E. & E.) Graves. Melanconium oblongum is associated with branch and twig mortality resulting in tree deformation, but not tree mortality. The fungus is considered only weakly pathogenic, successfully infecting primarily trees under stress.

Widespread mortality of butternut was noted in southwest Wisconsin in 1967 (Renlund, 1971). A new fungus, tentatively identified as a species of Sirococcus, has been consistently isolated from cankers causing this mortality.[1] Pathogenicity tests with this fungus, conducted by Thomas H. Nicholls, U. S. Forest Service, and James E. Kuntz, University of Wisconsin, show that this fungus is a primary pathogen and can infect through nonwounded stem tissues (Nicholls, 1977).

OBJECTIVE

The objective of this survey was to determine the distribution of canker-related butternut mortality throughout the range of butternut in the United States.

[1]The scientists who identified the fungus are Michael J. Larsen, U.S. Forest Service, Forest Products Laboratory, Madison, Wisconsin; Charles S. Hodges, U.S. Forest Service, Pacific Southwest Forest Experiment Station, Honolulu, Hawaii; and B. C. Sutton, Commonwealth Mycological Institute, Kew, Surrey, England.

Figure 1. Black exudate from a canker on butternut – one of the first signs of the disease on the stems.

Figure 2. An exposed canker on butternut. Sirococcus may be isolated from the leading edge of this canker.

METHODS

A pest alert describing the symptoms of butternut decline was distributed to participating state personnel to familiarize them with the disease symptoms. These cooperators were asked to provide the following information by county:

(1) butternut present, no cankers, and
(2) butternut present, cankers.

If trees with signs of incipient infection or with cankers (Figures 1 & 2) were found, the cooperators were asked to send samples of diseased material to the Forest Insect & Disease Management Staff for examination and culturing for the primary pathogen. A map was constructed denoting the distribution of cankered trees and trees from which the primary pathogen was recovered.

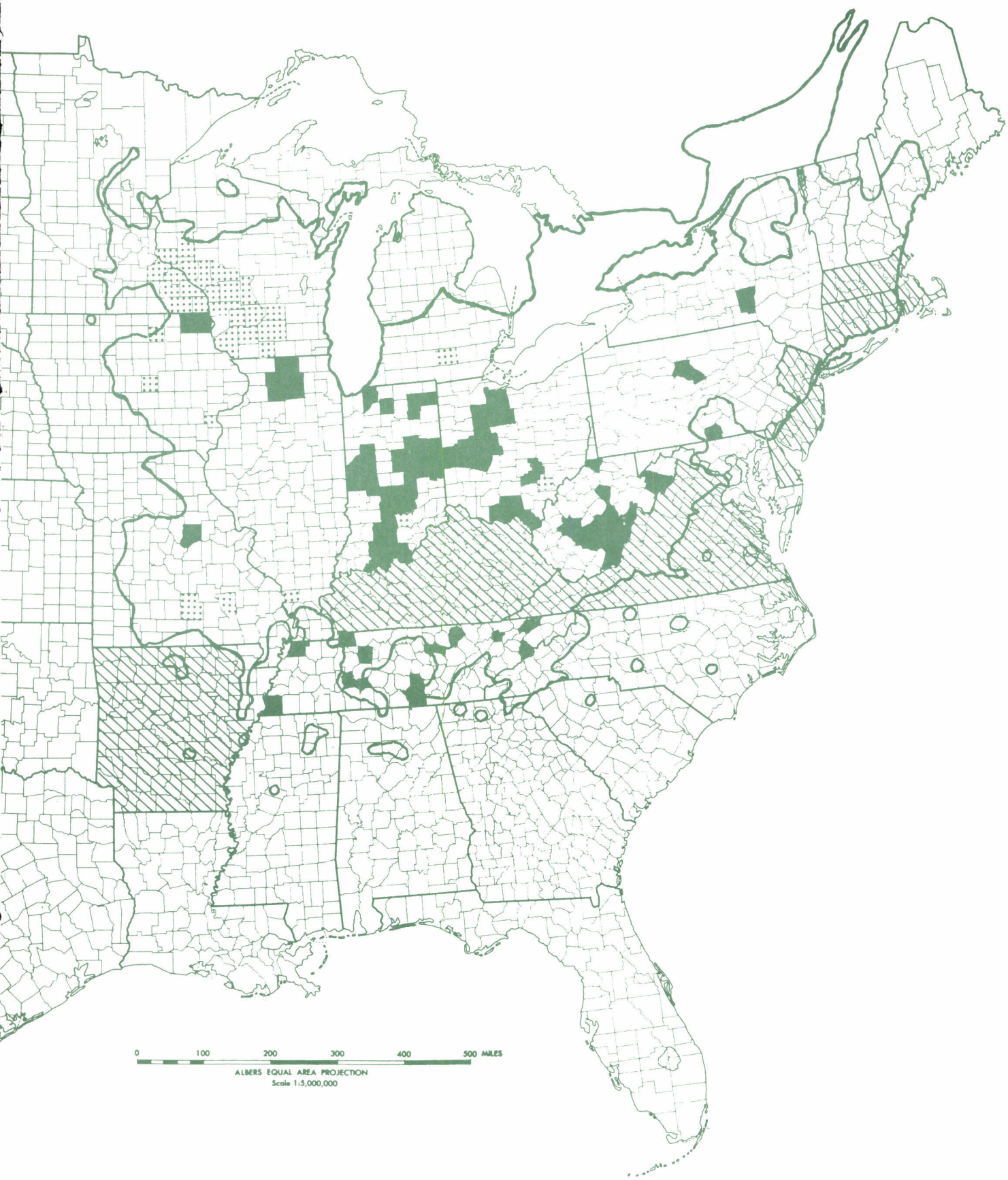

Figure 3. Distribution by county of cankered butternut trees from which Sirococcus was isolated and not isolated. ▨ No report; ☐ No cankers; ■ Cankers-Sirococcus not isolated; ▦ Cankers-Sirococcus isolated; — Range of butternut.

RESULTS AND DISCUSSION

Butternut decline was reported over most of the butternut range (Figure 3). Sixteen of the 24 states surveyed replied. Of these two states (North and South Carolina) stated that the disease has essentially eliminated butternut, two states (New Hampshire and Vermont) reported no cankered trees, and 12 states reported cankered trees. *Sirococcus* was isolated from samples from eight of these 12 states (Table 1).

Trees in south central Minnesota, northeastern Wisconsin, Vermont and New Hampshire appear to be disease-free. It is possible that the climatic conditions are a limiting factor or that the disease is just approaching these geographic areas and has not affected the trees yet. It is also possible that butternut is a threatened species and could become an endangered species because of this disease.

Additional research on butternut decline is needed to identify the species of *Sirococcus* involved, to determine the characteristics of the disease, and to work to develop controls.

Field personnel should look for and mark apparently disease-resistant butternut trees located in heavily infected stands. Report the location of such trees to the U.S.D.A., Forest Service, NA, S&PF, 370 Reed Road, Broomall, PA 19008. These trees will be used for research and eventually may serve as the basis of a disease-resistant tree breeding program.

Table 1. Results of butternut decline survey by state, 1977

Cankered trees reported	*Sirococcus* isolated	No cankered trees reported	No report
Minnesota	Minnesota	Vermont	Massachusetts
Wisconsin	Wisconsin	New Hampshire	Connecticut
Michigan	Michigan		Rhode Island
Iowa	Iowa		New Jersey
Missouri	Missouri		Delaware
Indiana	Indiana		Virginia
Illinois	Illinois		Kentucky
Ohio	Ohio		Arkansas
Tennessee			
West Virginia			
Pennsylvania			
New York			
South Carolina[1]			
North Carolina[1]			

[1]No samples were received from North or South Carolina because the disease has essentially eliminated butternut there.

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